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ment of Science did not yield much in the way of botanical papers. A half dozen papers, some scarcely passable, constituted the whole contribution from the botanists of the Association. What are our botanists doing? Doubtless they are busy; but it is not creditable to American science that so few papers were presented by them, especially when we bear in mind the length of the list of American botanists. A movement is under way to make a better showing in botany at the Montreal meeting.——One of the best botanical papers presented at Cincinnati was by Dr. Beal on the "Movements of Roots in germinating Indian Corn." Darwin's statement that "in whatever direction the primary radicle first protrudes from the seed, geotropism guides it perpendicularly downwards," was shown to require modification. Over four hundred kernels of sprouted Indian corn were placed over a large pan of water and set in the dark. No gummed papers were placed on the radicle-tips of these, yet they took many different directions. In all the lots, one coil or more was a very common thing; some coiling over and some under. Many went downwards, some in nearly a horizontal position, several directly upward where two of them made three coils each. No roots were tested in soil. An abstract cannot do this paper justice, since it was much condensed as it was presented. The results were quite remarkable. At another time some seeds were sprouted over water in the dark. Small pieces of gum paper placed a trifle one side of the tip, usually caused the root to bend away to a marked degree, sometimes only a trifle, and sometimes it produced no effect.——Professor Penhallow's paper on the "Phenomena of Growth in Plants," dealt with the movements of the stem and tendrils of the Mammoth squash.——Professor Meehan contributed "Additional facts on the Fertilization of Yucca." By artificial self-fertilization of pistils of *Yucca angustifolia*, fruit was obtained, although the pollen was applied to the *external* lobes of the stigma.——The August number of the *American Monthly Microscopical Journal* contains half a dozen formulæ for preservative media for use in mounting microscopical preparations of vegetable tissues.——Rand, McNally & Co., of Chicago, have just issued "The American Encyclopædia of Agriculture," by Jonathan Periam. An examination of the botanical part of the work shows that unusual care has been taken in its preparation.

ZOÖLOGY.

Recent Zoological Work in France.—Among the most important zoölogical memoirs published in France, are those to be found in Lacaze-Duthier's Archives de Zoologie expérimentale et générale. The eighth volume, for 1879–'80, contains an elaborate essay, with most excellent plates, some of them printed on stone in colors, by L. C. Cosmorici, on the anatomy of the polychete Annelids. This is followed by a similar paper on a leech *(Batracobdella latastii)*, by Dr. C. Viguier, which is succeeded by an abstract of Professor W. K. Brooks' essay on the development of Lingula, a compliment to American science. Then follows a valuable essay on the existence of the *saiga* in France in the Quaternary epoch, by Professor A. Gaudry. The reproduction of sponges by external budding is discussed by C. de Merejkowsky. This subject has heretofore been treated only in a fragmentary way. It is known to take place only in one family (Suberitidinæ, in the genera Suberites, Tetilla, Tethya and Rinalda). The buds are always produced under the form of an expansion at the extremity of a stem or peduncle which arises from the surface of the body of the sponge. The peduncle supporting the bud or enlargement, is always solid and composed of spicules and of the syncytium without canal and without pores; while the bud itself is produced by the syncytium alone and its spicules, without any participation by the entoderm; and its cavities, at first entirely wanting, are formed independently of the maternal cavity. In an abstract of the author's views as to the morphology of the sponges and hydroids, he believes that the hydroid as well as the sponge, is the product of the multiplication of this primitive individual, but while the hydroid is a polymorphous colony composed of completely distinct and separate individuals, regularly disposed in a determinate order, the sponge is formed of a colony of individuals irregularly dispersed, without any arrangement, and forming a single compact mass. In his researches on the histology and development of Campanularia, M. J. Fraipont makes a valuable contribution to the literature of the history of the origin of the genital glands in this hydroid.

The Monera of Central Russia are described by A. Korotnoff, who has rediscovered Haeckel's *Protamœba primordialis*, which he regards as occupying the lowest place in the class of Rhizopodes. Other Amœboid forms are described, as well as the development of Pelomyxa, to which a plate is devoted. Professor Patrick Geddes publishes in these archives his observations on the perivisceral fluid of the sea urchin and the corpuscles contained in this fluid. The viviparity of *Helix studieriana* engages the attention of Professor Viguier, while the last paper of the volume is by the editor, on *Laura geradiæ*, elsewhere noticed in this journal.

EVOLUTION AND HYBRIDISM IN ORNITHOLOGY.—In a review in *Nature*, of the British Museum Catalogue of Birds, volume fifth, containing the family *Turdidæ*, by Henry Seebohm, it is stated that one great feature of the work is the courage which the author has shown in applying the doctrine of the evolution of species to the birds as they exist at the present day. The great risk that the reviewer sees in Mr. Seebohm's method lies in the fact that it affords too easy a solution for otherwise difficult problems, but we must remember that the author was himself witness to the inter-breeding of the carrion crow and the hooded crow in Siberia, and it is known that this also takes place in certain parts of Great Britain. Having seen this with his own eyes, and brought back to England a large series of the hybrids, it was only reasonable for him to suppose that other birds are also capable of hybridizing, and the reviewer thinks that the author proves his case with regard to the two blue rock thrushes (*Monticola cyanus* and *M. solitarius*), which in certain parts of China interbreed; and it is most curious that the vast majority of the birds found in the winter quarters of the Eastern blue rock thrush, from Burmah and Malaisia to the Mollucca islands, appear to be hybrids. According to the author, *Cettia cantans* and *C. minuta* also interbreed, and produce an intermediate form which he calls *Cettia cantans minuta*, a reintroduction of trinomial nomenclature which the reviewer does not at all like. The intermediate form, too, appears to be principally found in the Island of Formosa, though also met with at Chefoo, on the mainland opposite Japan, while one of the other forms is an inhabitant of Japan, with the exception of one Formosan skin in the author's collection, and the other is said to breed in South China and Hainan. Of these three forms, then, we should suppose that the Formosan was the oldest bird from which the other two had developed themselves, but that they had not as yet become entirely separated as distinct species. We must wait for more evidence with regard to the South African chats, to some of which Mr. Seebohm has applied his principle of hybridization, as the reviewer is not yet satisfied that the changes of plumage cannot be accounted for by the more natural process due to age or the season of the year.

BREEDING HABITS OF THE FISH HAWK.—On the 28th of April I visited, in the southern part of Rhode Island, what could be called a colony of these birds, for from my position at a nest in the top of a buttonwood tree, I could count no less than twelve of their massive structures, all in a radius of half a mile. In one tree I saw what appeared to be two nests, but on closer examination found that a nest had fallen and lodged in the lower branches, the birds using the old site for a new home.

As one approaches their nest the bird stands up, whistling a shrill peep, on coming nearer it rises, and after a circle or two sometimes re-alights, inspects its eggs, and if the intruder does not withdraw, the cries of distress bring the male, after which both birds circle over the nest, the male higher and showing less anxiety than the female.

In one case, on ascending to the nest of an old pair, I was attacked by the birds and forced to descend; but I think it is seldom that they manifest so much courage. The bird at other times is extremely cowardly, allowing crows to chase it, and once I saw a crow blackbird, whether *Quiscalus versicolor* or *æneus*, I do not know, that had its nest in the basement of a fish hawk's, attack and drive its host from home.

The nests of the fish hawks were by no means shabby. The sticks, of which they were composed, were short and crooked and so firmly held together by turf and eelgrass, that it was a difficult undertaking to obtain the eggs by tunneling from the bottom. The top is very shallow ; in the nests that I examined it was not more than two inches deep, but averaging fifty-four inches in diameter. I noticed that the female sits during the day for a long period before the eggs are laid; more than two weeks in one case. During the night she leaves the nest and roosts on a neighboring limb, where she is very indifferent to all about her, even allowing a person to throw stones at her without flying off. If the nest be disturbed during the night, when there are young or eggs, the bird flies off only uttering a few cries, and does not return while its nest is being robbed.

I examined more than twenty trees in which nests were placed, and found them all alive, but in a few cases the limb on which the nest was placed, was dead.—*H. C. Bumpus.*

BLACKBIRDS CATCHING FISH.—A mill-dam is in process of repair near my residence, on Boone river. Visiting the spot to-day, I was much amused to see some crow blackbirds catching minnows ! At one end of the dam the water was forcing its way through in a small stream which ran with great rapidity, from the descent as well as from the pressure above. This little stream spread out over some loose boulders in a sort of fan-shape, being generally not more than one inch deep. Up this steep place myriads of minnows, two to three inches in length, were trying to force their way. Many of them were unable to stem the current and were swept down stream. In this swift, shallow water, three or four crow blackbirds (doubtless *Quiscalus æneus* Ridgway) were wading about, keen and alert, every moment or two picking up and swallowing a minnow. They appeared to understand their business to perfection, and made no mistakes—seeming to get one of the little fishes every time they made the attempt. I have often seen these birds wading in the shallow water along the margin of the stream, but this is the first instance in which I have seen them capture fish. They are very tame, making themselves entirely "at home" in our barnyards and fields. The groves along our little river are their favorite nesting-places. There used to be some complaint in regard to their raids upon cornfields just as the young blades were a couple of inches high, but I have heard nothing of the kind in recent years.—*Charles Aldrich, Webster City, Iowa, May 11, 1881.*

HABITS OF THE ROCKY MOUNTAIN AXOLOTL.—Mr. W. E. Carlin, in an article in the Proceedings of the U. S. National Museum, on *Siredon lichenoides,* the larva of Amblystoma, observed by him in Lake Como, Wyoming Territory, states that they never enter the stream of fresh water, preferring the alkali water of the lake. The change from alkali to fresh water undoubtedly hastens the metamorphosis into the Amblystoma form. "In two cases the change in external appearance was so abrupt that I would have been almost certain that another salamander had been substituted for the one in the jar, had I not had him so completely under observation that it was impossible. The gills had assumed a stubby form about half the length that they were the night before, and the gill on the back of the body was nearly half gone; it took air quite often, and I removed it from the jar and placed it in a box with some lake grass around it to keep it moist. It completed the metamorphosis in a few days. I did not feed it any during this time. While it was in the jar it was well fed with flies." Mr. Carlin found that the axolotl late in July and during August, leaves the lake in large numbers on rainy days and transform. "While catching Siredon, I have seen and caught a number of Amblystoma in the lake, with the metamorphosis, as far as I could see, as complete as those we find half a mile from the lake. They cover the ground by thousands during a warm summer rain, coming from every conceivable place where they could have found shelter, from under rocks, boards, old ties, and out of gopher holes. I have a cat that eats them greedily, and I am told by a resident that the numerous skunks that live around the lake live principally on them." After the first frost they completely disappear.

SYSTEMATIC POSITION OF BALANOGLOSSUS.—Elias Metschnikoff has returned to the view which he expressed twelve years ago with regard to the close affinity between this curious "worm" and the Echinoderms. The larvæ of the two types are identical, since the differences insisted on by A. Agassiz as regards the water-vascular system have been shown by Goette to be erroneous. Metschnikoff claims that the water-vascular system, which is so eminently characteristic of the Echinoderms, is represented in Balanoglossus by the proboscis-sac, which he regards as a single, conical, ambulacral tentacle, and it should be borne in mind that in Synapta, which is a genuine Holothurian, not only the ambulacral cœcal sacs, but also the longitudinal trunks are lost. The peritoneal system would also seem to be represented in Balanoglossus, and is lined by just the kind of membrane as in the Holothurians, while the circulatory system in these Echinoderms is very similar to that of Balanoglossus. He regards the gills as rudimentary water-vessels delayed in development and undergoing vegetative repetition. The absence of calcareous matter from the integument of the worm is a notable point of difference, but on the other hand the nervous system is very similar. The author therefore proposes to form the type *Ambulacraria*, with the two sub-types of *Radiata* and *Bilateralia*, the type of the latter group being Balanoglossus.

UNUSUAL ACTIONS OF A HEN TURKEY.—While visiting in the southern part of Indiana, this spring, my attention was called to the strange proceedings of a young hen turkey. She was on her first "setting" of eggs, and was doing her best apparently, but nothing came of it. For two months she kept her place steadily and at the end of that time an attempt was made to break up the nest. It was found there were but two eggs left of the seven she began with. It was a complete disappearance, not even a trace of the five missing eggs being left. The next day an egg was accidentally discovered in a woody pasture, a quarter of a mile from the nest, having been apparently dropped there. It was very light, being almost empty. On the following day, while half a dozen of the family were sitting under the trees within twenty yards of the nest, the turkey rose, flying high over the house and off towards the pasture, and in her mouth was an egg. A visit to the nest showed but one egg left. In a short time the hen came walking back and took her place on the nest. It was evident that six eggs had been carried off in this way at different times and dropped in different places. Whether this proceeding showed a feeling of disgust on the part of the turkey, or was merely an instinctive clearing of the nest, I cannot say.—*John M. Coulter.*

CHANGE OF COLOR IN CRABS AND PRAWNS.—Dr. Fritz Müller contributes some instances of this phenomenon—already discovered by Kröyer—from the Brazilian fauna. A shrimp *(Atycida potimirim)* has a female which, when adult and living among water-plants, is usually dark green, sometimes inclined to blue or brown, occasionally of a pure blue with a pale brown streak down the back; when put into a glass vessel it fades to an increasingly pale brown, which disappears and leaves the animal colorless and transparent in the course of a few days; a dark brown specimen placed with a number of others which had the usual greenish hue assumed their color in a few minutes. A black Palæmon taken from deep water became first dark, then pale blue, and the color, losing its even distribution, became accumulated in many closely-packed patches; after half a day from the time of capture it had lost all color, with the exception of the caudal swimmeret, which remained blue. The male of a small land crab (Gelasimus), whose carapace is marked with pure white and light green, loses these colors when captured, and they are replaced by a uniform gray.—*Journal of the Royal Microscopical Society.*

THE BLUE GULL.—During some of our wet seasons a little blue gull stays with us all through the summer. I believe they always come here in the spring, but if the water dries out of the ponds and sloughs, they do not remain—probably retiring to the lakes, where open water is always to be found in warm weather. They are quite tame, flying often very close to men and teams. They seldom alight upon the ground, and it is a popular notion that they are never seen except on the wing. I have, however, occasionally seen them sitting upon the muskrat ponds out in the sloughs. They often follow a plowman, greedily devouring the worms and bugs which are turned up to the surface. Fluttering down very gracefully, they pick up their game without setting a foot upon the ground! In this manner they requently follow the plow for hours, so intent upon their work that they might easily be killed with a blow from the plowman's whip.—*Charles Aldrich, Webster City, Iowa, May 11, 1881.*

MALE CRUSTACEA PRODUCING EGGS.—In the course of his studies on the Amphipods of the Adriatic, Herr Neteski found that eggs are developed in the testes of the males. These organs are in the form of simple tubes, consisting of a germ-gland and an efferent portion. Only the hinder half of the tubes produce male products, the anterior quite constantly developing eggs, but for these there is no special duct. The egg-producing portion has much the same microscopic structure as that in which the spermatozoa are developed, and the rudimentary eggs are only distinguished from the spermatoblasts by developing into eggs. The eggs developed in the male differ from those of the female in the structure of their protoplasm, for the yolk-spheres are not in them so distinctly developed, and it would appear that they never become fully matured. This remarkable phenomenon has not, therefore, any physiological significance, and in structure the organ is truly a testis. The author reminds us that Phalangium stands in a similar condition.

ANIMAL PESTS IN GREENWOOD CEMETERY.—The New York *Sun*, citing the report of the trustees of Greenwood Cemetery for 1880, says: "It is noted that chipmunks made their appearance in the cemetery during the last year for the first time. The injury done by them has been deemed a sufficient cause for their extermination, and 2853 of them were killed. Ground mice to the number of 375, 148 cats, 40 dogs, 133 snakes, 24 moles and 54 rats have also been killed.

ZOÖLOGICAL NOTES.—A nervous system has been discovered by Dr. Chun in the *Velellidæ*, a family of Siphonophores; it consists of a quite typically differentiated plexus of branching and intercommunicating ganglion-cells.——The coloring matter of jelly fishes has been investigated by Professor McKendrick, who finds that it consists of little irregular particles scattered through the protoplasm. It was also examined with the spectroscope.——The sixth and seventh parts of Bütschli's Protozoa have appeared. This work forms a volume of Bronn's *Classen und Ordnungen des Thierreichs*. The author believes that Bessel's account of Bathybius is worthy of all confidence, while he inclines to the view that Eozoon is inorganic.——The sexual organs of the harvest men (Phalangidæ) have been critically examined by Dr. Blanc, who, after describing the testes and ovary, states that in young males eggs often occur on the surface of the testes; so that here there is a rudimentary hermaphroditism, the structural arrangement, however, not permitting self-fertilization.——Whether the shells of Planorbis are dextral or sinistral, Mr. R. E. C. Stearns discusses in a very interesting and suggestive paper in the Proceedings of the Academy of Natural Sciences, of Philadelphia. He believes that they are sinistral. The variations in the shells of certain species are then described in a way to be of much value from an evolutionary standpoint.——The publication of the Bulletin of the Buffalo Society of Natural Sciences has been resumed by the issue of the first number of Volume IV, the most interesting article in which is Mr. E. E. Fish's on the imitative and ventriloquial power of birds, containing original observations of merit.——A third paper on American spiders, by Count Keyserling, appears in Verhandlungen der K. K. Zoöl.-bot. Gesellschaft in Wien. Among the new species are *Epeira cavatica* from caves in Kentucky, and *Cœlotes juvenilis* from Mammoth cave.——We glean the following notes from the Proceedings of the U. S. National Museum, June–August: Capt. Bendire has shown that the supposed land-locked little red salmon (*Oncorhynchus kennerlyi*) of the Upper Columbia, is nothing but the young breeding male or grilse of *Oncorhynchus nerka*.——The genera and species of the family *Centrarchidæ* are reviewed by Mr. C. L. McKay. The detailed review of the genus Centurus will interest ornithologists, while there are several descriptive ichthyological papers by Bean, Jordan, Lockington, Rosa Smith and Gill.

ENTOMOLOGY.[1]

NOTES ON HYDROPHILUS TRIANGULARIS.—The article by Mr. Garman in the August number has provoked an inquiry as to the appearance of the water beetle there referred to. The accompanying illustration (Fig. 1, *b*) will, we believe, convey the desired information even better than could words.

Having, in 1876, reared *Hydrophilus triangularis* from the egg to the perfect state, and made a number of notes upon it, we would take this occasion to supplement Mr. Garman's article with a few facts that may interest the general reader. The asymmetry in the jaws, noted by Mr. Garman, is constant so far as we have observed, and is, in fact, quite common in Carabidæ generally. The egg-case of *H. triangularis*, described by Mr. Garman, differs materially from that of the European *H. piceus*, according to descriptions of this last. We found the former to consist virtually of three distinct parts, and the subsidiary figure (2) will, perhaps, more fully indicate these parts than did Mr. Garman's outlines. There is, *first*, what may be called the floater (Fig. 2, *c*), which

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[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.